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19. ABSTRACT (Can name as resource if necessary and identify by block number) <p>The technical program of the 1988 Gordon Conference on Polymers (West) came together exactly as outlined in the proposal requesting support. The final program as it occurred is appended. There were sixteen speakers: seven from the US, three from Israel, two from West Germany, and one each from Australia, Canada, Japan and the United Kingdom.</p> <p>While this Gordon Conference has a charter to cover the entire area of polymers, from chemical synthesis to solid-state properties, that is naturally a difficult goal to achieve. The guiding principal in the organization of this particular conference was that this broad coverage could be best achieved if there were a unifying sub-theme running through these different areas. The main sub-theme for this conference was surfaces, interfaces and microstructured polymers.</p>			
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AFOSR-TR- 89 - 0261

REPORT TO THE AIR FORCE OFFICE OF SCIENTIFIC RESEARCH  
ON GRANT NO. AFOSR-88-0108  
FOR THE PARTIAL SUPPORT OF THE  
1988 GORDON CONFERENCE ON POLYMERS (WEST)

Principal Investigator: Alexander M. Cruickshank, Director  
Gordon Research Conferences  
Pastore Chemical Laboratory  
University Rhode Island  
Kingston, Rhode Island 02881-0801

Conference Chairman: M. Tirrell  
Vice Chairman: E.A. DiMarzio

## FINAL REPORT ON GRANT NO AFOSR-88-0108

The technical program of the 1988 Gordon Conference on Polymers (West) came together exactly as outlined in the proposal requesting support. The final program as it occurred is appended. There were sixteen speakers: seven from the US, three from Israel, two from West Germany, and one each from Australia, Canada, Japan and the United Kingdom.

While this Gordon Conference has a charter to cover the entire area of polymers, from chemical synthesis to solid-state properties, that is naturally a difficult goal to achieve. The guiding principal in the organization of this particular conference was that this broad coverage could be best achieved if there were a unifying sub-theme running through these different areas. The main sub-theme for this conference was surfaces, interfaces and microstructured polymers.

**Wegner** opened the conference with a lecture pointing out some of the possibilities in synthesizing polymers with self-organizing properties. Current polymer processing relies mainly on input of mechanical and thermal energy to shape polymers. An alternative that his group is developing is to build molecules that assemble themselves into various functional structures. Most of his examples were in the domain of liquid crystalline polymers. **Sagiv** discussed means of modifying solid surfaces by self-assembled layers of adsorbed amphiphiles.

**Stupp** has looked at the effects of orienting surfaces and fields on the organization of liquid crystalline polymers. This are directly related to applications in LC displays and possibly newer technologies. **Whitesides'** lecture was complementary and similar to **Sagiv's**. It was philosophically similar but looked at different chemical systems. Where **Sagiv's** chemistry was built around silane coupling to silica surfaces, **Whitesides'** was thiols and disulfides bound to gold surfaces. **Rabe**, from **Wegner's** group, discussed some of the first applications of scanning tunneling microscopy to organic polymers on surfaces.

**Horn** and **Hadziioannou**, in separate lectures, described their efforts to look at the dynamics of very thin (tens of angstroms) layers of polymer melts, for example to measure their viscosities, which can be very much different from the viscosities of the same polymer fluids in bulk. The application motivating in part the IBM work is lubrication in magnetic recording equipment. The tool in both groups was the Israelachvili surface forces apparatus. **Israelachvili** himself came up from Santa Barbara to chair this session.

**Gast** spoke about experiment work on the measurement of adsorption and micellization of amphiphilic polymers, such as block copolymers. **Winnik** discussed the applications of fluorescence spectroscopy to the study of polymer structure in colloidal particles.

The lectures of **Yu** and of **Klein** discussed diffusion of polymer molecules in two different interfacial environments. **Yu's** talk was on polymers adsorbed at liquid vapor interfaces such as the surface of a Langmuir trough. **Klein's** was on interdiffusion of polymer across melt interfaces.

**Kawasaki** discussed the theory of the dynamic of phase separation in polymer blends and block copolymers. **Russell** described some of the first work on thin polymer layers using the relatively new technique of neutron reflection.

**Keith**, one of the developers of the first theory of polymer crystallization, gave an overview of the current status of the field. His talk was illustrated with beautiful electron microscopy. **Organ** followed up the next day describing her work on crystallization of long alkanes, model molecules for polyethylene. **Rabin** was the last speaker and spoke about a newly developed theory of the rheological properties of polyelectrolytes.



Codes	
Dist	Avail and/or Special
A-1	

**Gordon Research Conference  
Polymers (West)  
Sheraton Hotel, Ventura, CA  
January 4-8, 1988**

Matthew Tirrell, Chairman

Edmund A. DiMarzio, Vice Chairman

**Monday 9:00 a.m.**

**Discussion Leader:**

**T.J. McCarthy**

1. Gerhard Wegner, Max Planck Institut für Polymerforschung  
"Ultrathin layers of polymers with molecular control over structure and performance"
2. Jacob Sagiv, Weizmann Institute  
"Monolayer techniques in studies of interactions at well-defined organic surfaces"

**Monday 5:00 p.m. - 6:00 p.m. and 9:00 p.m. - 11:00 p.m.**

**Poster Session**

**Discussion Leader:**

**E.A. DiMarzio**

**Monday 7:30 p.m.**

**Discussion Leader:**

**C.K. Ober**

3. Samuel I. Stupp, University of Illinois  
"The ordering of liquid crystal polymers by surfaces and fields"

**Tuesday 9:00 a.m.**

**Discussion Leader:**

**D.A. Tirrell**

4. George M. Whitesides, Harvard University  
"Organic surface chemistry: functionalized organic polymers and self-assembled monolayers"

**Discussion Leader:**

**J.F. Rabolt**

5. Jürgen P. Rabe, Max Planck Institut für Polymerforschung  
"Scanning tunneling microscopy on organic materials"

**Tuesday 7:30 p.m.**

**Discussion Leader:**

**J. Israelachvili**

6. Roger Horn, Australian National University  
"Structure and viscosity of very thin polymer films"
7. Georges Hadzioannou, IBM, Almaden  
"Viscoelastic properties of thin film liquid polymers confined between solid surfaces"

**Wednesday 9:00 a.m.**

**Discussion Leader:**

**C.W. Frank**

8. Alice P. Gast, Stanford University  
"Adsorption of amphiphilic copolymers: block copolymers and end-tagged chains"
9. Mitchell A. Winnik, University of Toronto  
"Morphology, flocculation and film formation of sterically stabilized colloidal dispersions"

**Wednesday 7:30 p.m.**

**Discussion Leader:**

**D.S. Pearson**

10. Hyuk Yu, University of Wisconsin  
"Polymeric monolayers probed by surface light scattering"
11. Jacob Klein, Weizmann Institute  
"Mutual diffusion in compatible polymer blends"

**Thursday 9:00 a.m.**

**Discussion Leader:**

**G.H. Fredrickson**

12. Kyozi Kawasaki, Kyushu University  
"Morphology of polymer blends and block copolymers with emphasis on dynamics"

**Discussion Leader:**

**F.S. Bates**

13. Thomas P. Russell (speaker), IBM, Almaden and Peter Green, Sandia National Laboratories  
"Statics and dynamics of homo- and block-copolymer films"

**Thursday 7:30 p.m.**

**Discussion Leader:**

**J.D. Hoffman**

14. H. Douglas Keith, AT&T Bell Laboratories  
"Recent developments in the study of spherulitic morphology"

**Friday 9:00 a.m.**

**Discussion Leader:**

**E.A. DiMarzio**

15. Sally J. Organ, University of Bristol  
"Chain folding and un-folding in ultra-long n-alkanes crystallized from solution"
16. Yitzhak Rabin, Weizmann Institute  
"Viscosity of polyelectrolyte solutions"

For information and application required to attend contact:

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Applications must be submitted by November 1, 1987.  
All fees must be paid by November 23, 1987.

For submission of posters contact:

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